



**VIRAL GASTROENTERITIS OUTBREAK ATTRIBUTED TO
NOROVIRUS
MARION COUNTY, KANSAS
JULY 2005**

FINAL REPORT DATE

July 20, 2005

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REPORTED BY

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BACKGROUND

On Tuesday, July 5, 2005, a Marion County citizen reported a possible foodborne outbreak to the Kansas Department of Health and Environment (KDHE). The caller stated 96 individuals from nine states (KS, AZ, CA, CO, FL, NE, OK, TX, WY) visited Marion County for a family reunion July 3—31 attendees had since experienced vomiting or diarrhea. Nearly all attendees ate a catered lunch at approximately 12:30 p.m. July 3. Foods were served buffet-style and included cubed pork, cole slaw, macaroni salad, potato salad, dinner rolls, and baked beans. Homemade desserts, iced tea, water, and lemonade were also served. Some attendees also shared other meals, including a July 3rd dinner where leftovers were served. KDHE and the Marion County Health Department (MCHD) initiated an outbreak investigation to determine the source of illness and implement appropriate control and prevention measures.

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METHODS

A cohort study was conducted to determine the cause of illness. MCHD and the Oklahoma State Department of Health assisted KDHE with interviewing reunion attendees. Each agency administered a uniform questionnaire to gather each individual's symptoms, food history, and travel history (see appendix).

Stool samples from seven ill individuals were submitted to KDHE Laboratories.

KDHE performed two inspections at the catering facility, including a Hazard Analysis and Critical Control Point (HACCP) inspection.

Cases were defined as individuals who experienced vomiting and/or diarrhea (more than three loose stools in a 24 hour period) after eating food served at the reunion Sunday, July 3.

RESULTS

Interviews were completed for 77 of the 96 attendees. Fifty-two (68%) individuals reported illness, and 43 (56%) met the case definition. The median age of the cases was 45 years (range, 2 - 79 years), and 44% were male.

Given the reported reunion lunchtime of 12:30 p.m., the median incubation period was 38 hours (range, 11 - 92.5 hours; see epidemic curve, Figure 1.0). The cases reported nausea (86%), vomiting (81%), stomachache (79%), diarrhea (63%), muscle aches (60%), and fever (42%). Illness duration varied. Among cases that had recovered before their interview (n=26) and mentioned a specific time and date of recovery (n=14), the median recovery time was 38.5 hours.

Univariate analysis of data from the cohort study demonstrated a significant association between potato salad consumption and illness. Persons who ate potato salad at lunch were at increased risk for illness (relative risk, 3.02; 95% confidence interval, 1.38 - 6.63; $p=0.0002$), as were persons who ate potato salad for dinner (relative risk, 3.20; 95% confidence interval, 0.94 - 10.84; $p=0.0110$). The same potato salad was served during both lunch and dinner July 3rd; however, not all attendees ate both meals. Risk of illness from eating potato salad at either meal was significantly associated with illness (relative risk, 2.09; 95% confidence interval, 1.37 - 3.18; $p<0.0001$). No other food or travel exposure was statistically linked to illness.

All seven stool samples tested positive for Norovirus—no bacterial pathogens were isolated. Two of the positive samples were forwarded to the Minnesota Department of Health for further characterization.

Three critical violations were observed during the initial catering facility inspection: unclean food equipment (can opener), an unlabeled chemical spray bottle, and a cold holding violation. A bare hand contact violation was observed during the HACCP inspection. No caterers reported illness prior to the reunion meal, including the foodhandler that prepared the potato salad.

CONCLUSION

The epidemiologic, clinical, and laboratory data collected regarding this outbreak are consistent with a point-source outbreak of Norovirus. Catered potato salad was statistically implicated as the cause of illness—persons who ate the dish were twice as likely to become ill compared to those that did not eat the potato salad. No food samples were tested to confirm viral contamination; historically, isolation of Norovirus from food has been difficult.^{*} The caterer who made the dish denied illness prior to the time of its preparation; however, asymptomatic carriers have been previously noted. Asymptomatic shedding of Norovirus may last for up to two weeks after initial infection.^{*} Alternatively, a reunion attendee may have introduced the virus into the salad while passing through the buffet line. This scenario is less likely, as 77 of the 96 attendees (all of those interviewed) denied gastrointestinal illness among household contacts in the week prior to the reunion, and only the potato salad was implicated as the source of illness. An ill attendee would likely have contaminated many items in the buffet line, not just one.

Norovirus is the leading cause of foodborne illness in the United States; an estimated 28 million people are infected with Norovirus every year—40% of these infections may be foodborne.[#] Onset of diarrhea and vomiting are common 12-48 hours after infection, and may last from 12 to 60 hours. Vomiting is more prevalent in children than adults. The disease is transmitted through fecal-oral routes; historically, Norovirus outbreaks have been associated with fecally contaminated foods, especially ready-to-eat foods such as salads, sandwiches, ice, cookies, and fruit.[¶]

Special care should be taken to avoid Norovirus contamination of ready-to-eat foods. Foodhandlers should be educated on proper handwashing and discouraged from bare hand contact with such foods.

ACKNOWLEDGEMENTS

KDHE is grateful for the assistance provided by the reunion attendees in completing outbreak questionnaires and obtaining stool specimens for testing.

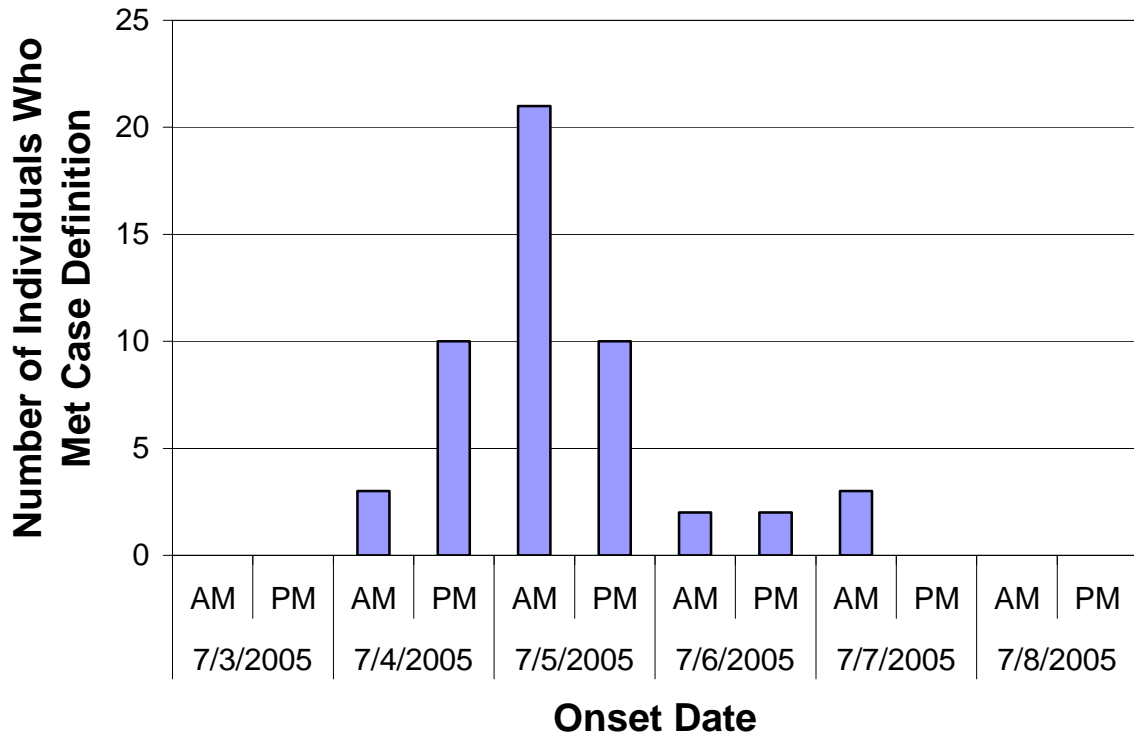
^{*} Centers for Disease Control and Prevention. "Norwalk-Like Viruses: Public Health Consequences and Outbreak Management." MMWR 2001:50(No. RR-09);1-18

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[#] Mead PS. Food related illness and death in the United States. Emerging Infectious Diseases, 1999. 5(6):607-625.

[¶] Centers for Disease Control and Prevention. "Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians and other Health Care Professionals." MMWR 2004:53(No. RR-4).

**Figure 1.0 - Cases by date of onset
(n=41*)**



*Two individuals that met the case definition (individuals who experienced vomiting and/or diarrhea after eating food served at the reunion Sunday, July 3) are excluded from Figure 1.0. One case's onset was 7/4/2005, but a time of illness was not obtained. The second case's onset was 7/9/2005, and may have been secondarily infected by an ill household contact.

APPENDIX - OUTBREAK QUESTIONNAIRE

Marion County, July 3, 2005

Date: _____
Interviewer: _____

Hello, my name is _____ and I am calling from the _____. We are investigating reports of possible foodborne illness in Marion County, Kansas. To determine the cause of illness, we need to interview individuals that attended the Marion County reunion -- we need to speak to those who became ill as well as those that did NOT become ill. Your participation is voluntary, and any information you provide will be kept confidential. The interview will take about 5 to 10 minutes. May I begin?

Last Name _____ First Name _____ Phone number _____

Address _____ City _____ State _____ Zip code _____

Date of birth _____ Sex _____

What day did you arrive in Marion County? _____

What day did you depart? _____

Where did you stay while visiting Marion County (hotel, with family, etc.)?

Food History

Saturday, July 2, 2005

Breakfast:

Restaurant? Y N (If yes, Name _____ Location _____)

Foods eaten _____

Lunch:

Restaurant? Y N (If yes, Name _____ Location _____)

Foods eaten _____

Dinner:

Restaurant? Y N (If yes, Name _____ Location _____)

Foods eaten _____

Other (snacks): _____

Sunday, July 3, 2005

Breakfast:

Restaurant? Y N (*If yes, Name* _____ *Location* _____)

Foods eaten _____

Did you eat at the reunion lunch catered by X?

Y N (*if "no", list where and foods eaten:* _____)

Pork	Y	N	Unk
Gravy	Y	N	Unk
Cole Slaw	Y	N	Unk
Macaroni Salad	Y	N	Unk
Potato Salad	Y	N	Unk
Dinner Rolls	Y	N	Unk
Cake	Y	N	Unk
Pie	Y	N	Unk
Brownie	Y	N	Unk
Tea	Y	N	Unk
Water	Y	N	Unk
Ice	Y	N	Unk
Other foods	Y	N	Unk

Type: Pineapple upside down, confetti, jello poke

Did you eat at the reunion dinner?

Y N (*if "no", list where and foods eaten:* _____)

Fried Chicken	Y	N	Unk
Cole Slaw	Y	N	Unk
Macaroni Salad	Y	N	Unk
Potato Salad	Y	N	Unk
Dinner Rolls	Y	N	Unk
Cake	Y	N	Unk
Pie	Y	N	Unk
Brownie	Y	N	Unk
Tea	Y	N	Unk
Water	Y	N	Unk
Ice	Y	N	Unk
Other foods	Y	N	Unk

Type: Pineapple upside down, confetti, jello poke

Monday, July 4, 2005

Breakfast:

Restaurant? Y N (*If yes, Name* _____ *Location* _____)

Foods eaten _____

Lunch:

Restaurant? Y N (*If yes, Name _____ Location _____*)

Foods eaten _____

Dinner:

Restaurant? Y N (*If yes, Name _____ Location _____*)

Foods eaten _____

Other (snacks): _____

Did you become ill after visiting Marion County? Y N (*if "no", skip to next page*)

First symptom _____ **Date** _____ **Time** _____ **AM** **PM**

Indicate all symptoms:

Diarrhea (more than 3 loose stools in a 24 hour period): Y N

Bloody diarrhea: Y N Number stools/24 hours: _____

Stomach ache: Y N Nausea: Y N

Vomiting: Y N Muscle aches/pains: Y N

Fever: Y N Highest temperature _____

Other symptoms? _____

Did you completely recover? Y N If so: **Date:** _____ **Time** _____ **AM** **PM**

Did you see or contact a doctor? Y N **Name of doctor** _____

Was a stool specimen collected? Y N

Were you hospitalized? Y N

Did anyone in your household experience vomiting or diarrheal illness in the week **PRIOR to the reunion?**

Name_____ Age_____ Onset date _____

Name_____ Age_____ Onset date _____

Name_____ Age_____ Onset date _____

Did anyone in your household that did not attend the reunion become ill?

Name_____ Age_____ Onset date _____

Name_____ Age_____ Onset date _____

Name_____ Age_____ Onset date _____